

The results of one run of these experiments, shown in Figure 7, clearly illustrate the increased sensitivity of the sensing arm to temperatures presented on the proximal side where the thermal sensor has the least thermal resistance between itself and the surface being measured.

5 Although the system described herein is ideally suited to plaque temperature sensing catheter designs, the same platform technology may be used to detect inflamed or malignant cells during other procedures, including laparoscopy, gastrointestinal endoscopy, ophthalmoscopy, arterography, and transcranial imaging. Other cardiovascular pathologies (e.g. myocarditis, valvulitis, aortitis) might also be detected by
10 using this device. Furthermore, as an alternative to electrical signal encoding, wide-angle fiber-optic technology may permit the production of a miniature fiber-optic probe that could be incorporated into the treatment catheter.

We claim:

1. A system for sensing the temperature of an arterial wall or other vessel,
2 comprising:
an elongated catheter having a distal end with a temperature sensing tip and a
4 proximal end including a manually operated expansion control;
the temperature sensing tip including one or more presentation elements, each
6 element having a temperature sensor supported thereon;
the presentation elements being physically coupled to the manually operated
8 expansion control, such that operation of the control causes the elements and temperature
sensors to move between a retracted position, enabling the temperature sensing tip to be
10 positioned in a section of the vessel to be measured, and an expanded position, wherein
the sensors are in contact or immediately proximate to the vessel wall; and
12 a data unit operative to receive signals from the temperature sensors and display
information indicative of vessel wall temperature as sensed by the sensors.

2. The system of claim 1, wherein the temperature sensors are thermistors.

3. The system of claim 1, wherein the presentation elements are thermally
2 insulative so that the sensors are isolated from the effects of blood flow or other ambient
conditions.

4. The system of claim 1, wherein the presentation elements have a cross
2 section, and the sensors are disposed asymmetrically relative to the cross section so that
the sensors are isolated from the effects of blood flow or other temperature gradients.

5. The system of claim 1, wherein the presentation elements are configured
2 such that blood may continue to flow around the elements when the elements are in the
expanded condition.

6. The system of claim 1, wherein the presentation elements are fingers
2 which expand outwardly in response to the manually operated expansion control.

7. The system of claim 6, wherein the fingers are cantilevered to provide a
2 relatively constant and uniform force against the vessel wall.

8. The system of claim 6, wherein the fingers surround a central plunger
2 coupled to the manually operated expansion control, such that pulling on the plunger
causes the fingers to expand outwardly.

9. The system of claim 8, wherein the plunger conically shaped in the area
2 where the plunger causes the fingers to spread.

10. The system of claim 8, wherein the fingers include an inner lip configured
2 to engage with the plunger to protect against over-spreading of the fingers.

11. The system of claim 8, wherein the temperature sensing tip features a
2 plurality of longitudinal slices such that the presentation system assumes a basket-like
structure which flares out in response to the manually operated expansion control.

12. The system of claim 1, further including at least one thermal sensor to
2 measure a non-wall temperature.

13. The system of claim 1, wherein the presentation elements include an outer
2 longitudinal groove into which the temperature sensors are embedded.

14. The system of claim 13, wherein temperature sensors are hardwired to the
2 data unit, and the grove extend the length of the catheter to receive the wires.

15. The system of claim 1, wherein the catheter is disposable.